Pen 8. 3 lbs. of Bean and Lentil mixture and 1 lb. of Bran per pig per day ; and Barley-meal, ad libitum.

Pen 9. A mixture of 1 part Bran, 2 parts Barley-meal, and 3 parts Bean and Lentil mixture, ad libitum.

Pen 10. Duplicate of Pen 9.

Pen 11. A mixture of 1 part Bran, 2 parts Bean and Lentil mixture, and 3 parts Barley-meal, ad libitum.

Pen 12. Duplicate of Pen 11.

On April 26th, 1850, the pigs were allotted by weight to the different pens. They were taken from a stock of 40, all of about nine months old, which had been bought at different styes and markets, in lots respectively of four, nine, eight, eight, and eleven ; and, as before, they were on the following day changed from pen to pen, so as to disturb as little as possible the weight within each pen, and at the same time to secure greater equality as to the character of the animals between pen and pen.

Table V., which follows, shows the weights of the pigs in each pen as thus allotted.

TABLE V.

(EXPERIMENTS WITH PIGS.—SERIES II)

Showing the Weights of the Pigs (in lbs.) when Allotted to the Pens, April 26, 1850.

Nos. of the Pigs.	Pen 1	Pen 2	Pen 3	Pen 4	Pen 5	Pen 6	Pen 7	Pen 8	Pen 9	Pen 10	Pen 11	Pen 12
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	138	138	138	137	136	134	134	133	129	128	127	127
2	117	125	124	120	122	123	120	120	126	125	124	127
3	115	105	106	114	111	112	112	113	116	116	116	116
Total weights of 3 pigs	370	368	368	371	369	369	366	366	371	369	367	370

After the allotment and this first weighing, all the pens were supplied with a mixture (given ad libitum) of one part Bran, one part Bean and Lentil meal, and one part Barley-meal. Upon this food they were kept for 13 days prior to commencing the exact experiment. There was, as usual, some inconvenience during this preliminary period until the pigs became accustomed to their new situation and new companions ; and this of course accounts for some of the irregularity in increase during this period, as shown in Table VI., which follows.

TABLE VI.

(EXPERIMENTS WITH PIGS.—SERIES II)

Showing the weight (in lbs.) Gained during the 13 Days of the Preliminary Period, and also the actual Weights at the Commencement of the exact experiment. May 9, 1850.

Nos. of the Pigs.	Pen 1		Pen 2		Pen 3		Pen 4		Pen 5		Pen 6	
	Gain in 13 Days.	Weight May 9.	Gain in 13 Days.	Weight May 9.	Gain in 13 Days.	Weight May 9.	Gain in 13 Days.	Weight May 9.	Gain in 13 Days.	Weight May 9.	Gain in 13 Days.	Weight May 9.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	20	158	27	165	17	155	16	153	30	166	15	149
2	16	133	23	148	6	130	16	136	27	149	20	143
3	27	142	28	133	14	120	28	142	22	133	24	136
Totals	63	433	78	446	37	405	60	431	79	448	59	428

Nos. of the Pigs.	Pen 7		Pen 8		Pen 9		Pen 10		Pen 11		Pen 12	
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	19	153	18	151	18	147	7	135	23	150	0	127
2	23	143	19	139	17	143	14	139	12	136	10	137
3	18	130	16	129	24	140	21	137	23	139	22	138
Totals	60	426	53	419	59	430	42	411	58	425	32	402

On May 9th, then, the exact experiment was commenced ; and the pigs were now put upon the dietaries which have been already described. The management, as to the supply of food, &c., was the same as before. The pigs themselves were weighed every 14 days ; and the experiment was continued for four such periods —that is, for a total period of 8 weeks.

The following Table (VII.) gives the increase in weight per pig and per pen in this Second Series.

TABLE VII.

(EXPERIMENTS WITH PIGS.—SERIES II)

Showing the *Gain in Weight* (in lbs.) upon each of the 12 different Dietaries, of *each Pig*, and of the *Pen of Three Pigs*, during each period of 14 Days, and during the entire experimental Period of 8 Weeks.

Nos. of Pigs.	PEN 1 Beans and Lentils (equal parts) Ad Libitum.					PEN 2 3 lbs. Barley Meal per Pig per Day. Beans and Lentils (equal parts) Ad Libitum.				
	1st Period 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.
1	33	7	13	24	77	41	22	28	29	120
2	−3	4	Died June 9	...	1	10	14	25	16	65
3	23	34	25	35	117	25	20	27	27	99
3 pigs.	53	45	38	59	195	76	56	80	72	284

TABLE VII.—*continued.*

(EXPERIMENTS WITH PIGS.—SERIES II)—*continued.*

Nos. of Pigs.	PEN 3 — 1 lb. Bran per Pig per Day. Beans and Lentils (equal parts) Ad Libitum.					PEN 4 — 3 lb. Barley Meal and 1 lb. Bran per Pig per Day. Beans and Lentils (equal parts) Ad Libitum.				
	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period 8 Weeks.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	20	16	22	25	83	23	21	24	19	87
2	25	12	25	19	81	26	16	17	Killed June 28	59
3	24	16	18	20	78	24	21	31	18	94
3 pigs.	69	44	65	64	242	73	58	72	37	240

Nos. of Pigs.	PEN 5 — Barley Meal Ad Libitum.				PEN 6 — 3 lbs. Bean and Lentil Meal Per Pig per Day. Barley Meal Ad Libitum.				
1	Died May 16.	24	28	10	62	35	15	11	14	75
2	37	35	41	29	142	39	23	28	23	113
3	29	19	21	18	87	28	15	20	Died June 20	63
3 pigs.	66	78	90	57	291	102	53	59	37	251

Nos. of Pigs.	PEN 7 — 1 lb. Bran per Pig per Day. Barley Meal Ad Libitum.					PEN 8 — 3 lbs. Bean and Lentil Meal and 1 lb. Bran per Pig per Day. Barley Meal Ad Libitum.				
1	30	20	21	24	95	35	17	29	20	101
2	35	22	17	22	96	— 3	Died May 29	...	...	—3
3	29	21	15	21	86	37	16	22	14	89
3 pigs.	94	63	53	67	277	69	33	51	34	187

TABLE VII.—*continued.*

(EXPERIMENTS WITH PIGS.—SERIES II)—*continued.*

Nos. of Pigs.	Pen 9 — Mixture of 1 part Bran, 2 parts Barley Meal, and 3 parts Beans & Lentils Ad Libitum.					Pen 10 — Duplicate of Pen 9.				
	1st Period 14 days.	2nd Period 14 Days.	3rd Period 14 Days.	4th Period 14 Days.	Total Period 8 Weeks.	1st Period 14 Days.	2nd Period 14 Days.	3rd Period 14 Days.	4th Period 14 Days.	Total Period 8 Weeks.
1	—3	20	28	Died June 20	45	28	24	19	22	93
2	32	21	22	21	96	29	14	18	18	79
3	31	30	25	26	112	31	33	20	27	111
3 pigs	60	71	75	47	253	88	71	57	67	283

Nos. of Pigs.	Pen 11 — Mixture of 1 part Bran, 2 parts Bean and Lentil Meal, and 3 parts Barley Meal, Ad Libitum.					Pen 12 — Duplicate of Pen 11.				
1	32	24	22	27	105	43	22	24	21	110
2	41	27	18	24	110	31	16	25	26	98
3	27	20	24	24	95	30	17	24	28	99
3 pigs	100	71	64	75	310	104	55	73	75	307

An inspection of this Table (VII.) shows that five of the pigs of this second series died during the experiment. It would appear that we were very unfortunate in one of the purchases, for all of these five pigs belonged to one of the lots of eight, and hence the loss was most probably due to the bad constitution of the animals. The weather was, however, excessively hot during part of the period of this experiment, and therefore unfavourable to the health of pigs fattening on a very liberal diet. It was evident that many did suffer from this cause; and that some of the losses were indeed in a great measure attributable to it.

These accidents, of course render it quite impossible to form any judgment of the value of the different foods by a comparison of the *actual gross results* of pen with pen. But we shall find, that, even with this greater irregularity in the amounts of actual increase obtained per pen than in the previous series, there is still, when we come to consider this increase in relation to

These five pens were devoted to the trial, as pig-food, of *dried Newfoundland cod-fish*—an article which could be supplied in large quantities, and at a moderate price, were it found available for this purpose. The experiments were so arranged as to ascertain in what proportions it could be most advantageously mixed with other foods; the dried cod-fish containing, as will be seen in our Table of Composition, a much higher percentage of nitrogen than any other current pig-food. Hence, if it were found otherwise available, it would yield a manure of corresponding richness.

It should be stated, that during the preliminary period, the pigs in Pens 1, 2, and 3 of this Series were supplied with the same food as had been given in the 12 pens of the First Series; namely, one part Bean and Lentil mixture, one part Indian-corn, and two parts Bran. Pens 4 and 5, however, were provided, during their preliminary period, with half a pound per pig per day of the dried Cod-fish, and were allowed to take ad libitum of a mixture of one part Bean and Lentil meal, one part Barley-meal, and one part Bran. The Cod-fish was in all cases prepared by boiling in water; and a portion of the other food was then stirred in with the soup thus obtained. It is scarcely necessary to mention that in all the experiments with pigs the food was mixed with water before it was put into the troughs.

The allowance of food to the several pens of the Third Series was as follows:—

Pen 1. 2 lbs. of dried Cod-fish per pig per day; with a mixture of equal parts of Indian meal and Bran, ad libitum.

Pen 2. 2 lbs. of dried Cod-fish per pig per day; with Indian meal, ad libitum.

Pen 3. Cod-fish, and a mixture of equal parts of Indian meal and Bran, each ad libitum.

Pen 4. 1 lb. of Cod-fish per pig per day; with a mixture of 2 parts Barley-meal and 1 part Bran, ad libitum.

Pen 5. 1 lb. of Cod-fish per pig per day; with Barley-meal, ad libitum.

Table X. gives the increase of each pig, and of each pen, upon these five dietaries, during each fortnightly period, and the total periods of eight weeks.

TABLE X.

(EXPERIMENTS WITH PIGS.—SERIES III)

Showing the *Gain in Weight* (in lbs.) upon each of the Five different Dietaries—of *each Pig*, and of the *Pen of Four Pigs*—during each Period of 14 Days—and during the entire Experimental Period of 8 Weeks.

Pig Nos.	PEN 1 — 2 lbs. Cod Fish per Pig per day. Bran and Indian-meal (equal parts) Ad Libitum.					PEN 2 — 2 lbs. Cod Fish per Pig per day. Indian-meal Ad Libitum.					PEN 3 — Bran and Indian-meal (equal parts), and Cod Fish, each Ad Libitum.					PEN 4 — 1 lb. Cod Fish per Pig per day. Mixture of 2 parts Barley-meal and 1 part Bran Ad Libitum.					PEN 5 — 1 lb. Cod Fish per Pig per day. Barley-meal Ad Libitum.				
	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	35	14	13	10	72	20	28	37	30	115	39	21	11	21	92	23	27	13	20	83	33	27	24	17	101
2	27	25	25	25	102	20	30	13	28	91	23	20	17	14	74	21	15	16	12	64	31	23	23	21	98
3	-17	31	22	21	57	39	29	32	22	122	19	17	16	16	68	27	19	19	18	83	44	25	22	3	94
4	18	26	25	23	92	-3	17	24	23	61	1	20	16	15	52	19	16	-3	39	71	30	23	21	9	83
4 Pigs.	63	96	85	79	323	76	104	106	103	389	82	78	60	66	286	90	77	45	89	301	138	98	90	50	376

As the experiment proceeded with Pens 1, 2, and 3, it was obvious that the fixed allowance of 2 lbs. of Cod-fish per pig per day, in the two former, was more than they would have taken had it not been so mixed with their other food as to oblige them to do so. It was evident, too, that the proportion of one part Bran to one part only of the Indian meal, in the ad libitum food of Pens 1 and 3, was also too great. In Pens 4 and 5, therefore, as the Table shows, only 1 lb. of Cod-fish per pig per day was given as the limited food; and in Pen 4, where Bran was given in the ad libitum food, the mixture was composed of only one part Bran to two parts of the Barley-meal.

The Table shows at a glance that there was throughout this Series, with Cod-fish, a very fair rate of increase per head; and we shall see further on, that the increase was also comparatively high in relation to the amount of food consumed. We observe, too, a marked superiority in Pen 2, where the Indian meal was given alone as ad libitum food, over Pen 1, where it was mixed with Bran; and the same in Pen 5 over Pen 4; the Barley-meal being mixed with Bran in the latter, and given alone in the former. This is only what we might expect, and the result is very consistent in the two cases.

The Pigs in Pens 1 and 2 of this Cod-fish Series were exceedingly fat; they indeed looked better than any, either in this or in either of the other Series. We shall have occasion to remark again on this experiment further on.

Before leaving the actual experimental results of these three Series of Pig experiments, and considering them more closely when brought by calculation to one uniform standard of comparison, or more minutely in reference to the chemical composition of the foods, it may be convenient to show the average *weekly* consumption *per head* of the unlimited, as well as of the limited, food; and also the average *weekly increase* obtained *per head* during each period, and the total period, in each of the 29 pens which the three Series of experiments comprise. These particulars are given for the several Series respectively in Tables XI., XII., and XIII., which follow.

Table XI.

(Experiments with Pigs.—Series I.)

Showing the Average Weekly Consumption of Food, and Increase in Weight per Head, during each Period, and the total Period of the Experiment.

Pen, Nos., &c.		Description, and average quantities of Food, consumed per Pig, per Week (lbs.)		Average Weekly Increase in Live Weight (lbs.) per Pig, during each Period, and the total Period of the Experiment.				
		Limited Foods.	Ad Libitum Foods.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Average of 8 Weeks.
Pen	Pigs							
1	3	None	63 lbs. bean & lentil meal (equal parts)	12·83	13·83	12·00	11·83	12·62
2	3	14 lbs. Indian meal	52 lbs. ditto	16·00	15·66	14·00	10·33	14·00
3	3	14 lbs. bran	40¼ lbs. ditto	13·83	10·00	3·66	5·83	8·33
4	3	14 lbs. Indian meal 14 lbs. bran	31½ lbs. ditto	11·50	8·83	9·66	12·00	10·50
5	3	None	45¼ lbs. Indian meal	9·66	6·00	12·00	9·18	9·21
6	3	14 lbs. bean & lentil meal (equal parts)	44¼ lbs. ditto	15·18	12·66	9·83	12·00	12·42
7	3	14 lbs. bran	44¼ lbs. ditto	11·00	14·67	13·83	12·00	12·87
8	3	14 lbs. bean & lentil meal (equal parts), 14 lbs. bran	36¾ lbs. ditto	17·50	14·50	11·18	14·66	14·46
9	3	14 lbs. bean & lentil meal (equal parts)	18 lbs. bran	1·50	5·00	4·83	5·33	4 16
10	3	14 lbs. Indian meal	23½ lbs. ditto	0·83	6·83	5·83	5·50	4·75
11	3	14 lbs. bean & lentil meal (equal parts), and 14 lbs. Indian meal	18 lbs. ditto	9·33	6·50	6·50	7·33	7·42
12	3	None	28½ lbs. bean and lentil meal (equal parts) 25½ lbs. Indian meal 3 lbs. bran.	15·83	10·83	7·00	8·66	10·58

TABLE XII.

(EXPERIMENTS WITH PIGS.—SERIES II.)

Showing the Average weekly Consumption of Food and Increase in Weight per Head during each Period, and the Total Period of the Experiment.

Pen, Nos., &c.		Description and average quantities of Food consumed, per Pig, per Week (lbs.).		Average Weekly Increase in Live Weight (lbs.) per Pig during each Period, and the Total Period of the Experiment.				
		Limited Foods.	Ad Libitum Foods.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Average of 8 Weeks.
Pen	Pigs.							
1	3	None	44 lbs. bean & lentil meal (equal parts)	8·83	7·50	9·50	14·75	10·14
2	3	21 lbs. barley meal .	51½ lbs. ditto .	12·67	9·33	13·33	12 00	11·83
3	3	7 lbs. bran	52¾ lbs. ditto .	11·50	7·33	10·83	10 67	10 08
4	3	21 lbs. barley meal and 7 lbs. bran	33 lbs. ditto .	12·17	9·67	12·00	9·25	10·77
5	3	None	68½ lbs. barley meal	11·00	13·00	15·00	9·50	12·12
6	3	21 lbs. bean & lentil meal (equal parts)	37¾ lbs. ditto .	17·00	8·83	9·83	9·25	11·23
7	3	7 lbs. bran	57½ lbs. ditto .	15·67	10·50	8·83	11·17	11·54
8	3	21 lbs. bean & lentil meal (equal parts) and 7 lbs. bran	25 lbs. ditto .	11·50	8·25	12·75	8·50	10·25
9	3	None	61½ lbs. of mixture of 1 part bran, 2 parts barley meal, and 3 parts bean and lentil meal	10·00	11·83	12·50	7·83	10·54
10	3	None	64¾ lbs., duplicate of Pen 9	14·67	11·83	9·50	11·17	11·79
11	3	None	65 lbs. of mixture of 1 part bran, 2 parts bean and lentil meal, and 3 parts barley meal	16·67	11·83	10·67	12·50	12·92
12	3	None	64 lbs., duplicate of Pen 11	17·33	9·17	12·17	12·50	12·79

TABLE XIII.

(EXPERIMENTS WITH PIGS.—SERIES III.)

Showing the *Average weekly Consumption* of Food and Increase in Weight *per Head*, during each Period, and during the total Period of the Experiment.

Pen, Nos., &c.		Description and average quantities of Food consumed, per Pig, per Week (lbs.)		Average Weekly Increase in Live Weight (lbs.) per Pig during each Period, and the total Period of the Experiment.				
		Limited Foods.	Ad Libitum Foods.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Average of 8 Weeks.
Pen	Pigs							
1	4	14 lbs. cod-fish .	47 lbs. of mixture of bran and Indian meal (equal parts)	7·87	12·00	10·62	9·87	10·09
2	4	14 lbs. cod-fish .	45¼ lbs. Indian meal . .	9·50	13·00	13·25	12·87	12·15
3	4	None	47 lbs. of mixture of bran and Indian meal (equal parts), and 7½ lbs. cod-fish.	10·25	9·75	7·50	8·25	8·94
4	4	7 lbs. cod-fish .	49 lbs. of mixture of 2 parts barley meal and 1 part bran.	11·25	9·62	5·62	11·12	9·40
5	5	7 lbs cod-fish .	57½ lbs. barley meal . .	17·25	12·25	11·25	6·25	11·75

From these Tables we learn the fact that the pigs consumed, on an average, about 60 lbs. of corn per head per week—or nearly 9 lbs. per head per day; and that where the quality of the food was good, they yielded from 10 lbs. to 12 lbs. of increase in live weight per head per week—or about 1½ lb. per head per day.

The amounts of food consumed per week, as given in these Tables (XI., XII., XIII.) are, it will be remembered, the averages of the whole period calculated *per head;* and those of the average weekly increase produced are also calculated per head; but the latter is given for each separate period, as well as for the total period. In the Tables which next follow, however (XIV., XV., XVI.), we have the weekly consumption of food *per* 100 *lbs. live weight of animal*, instead of per head; and calculated for each period of the experiment separately, instead of only for the total period. We have now, too, instead of the rate of increase *per head* during each separate period, the amount of increase obtained *for each* 100 *lbs. of food consumed*. In these Tables, therefore, we have the rate of *consumption* and of *increase*, during the successive periods of the experiment—each calculated to a uniform standard. And, it will be seen, that the results as thus arranged, clearly bring to view the influence of the progress of the animal, both upon the rate of consumption of food, and upon its productiveness—as already briefly alluded to, when commenting upon the results of Pen 12 of the First Series of experiments. We shall call attention to these Tables somewhat in detail.

Table XIV.

(Experiments with Pigs.—Series I.)

Showing the Average Weekly Consumption of Food per 100 lbs. Live Weight of Animal—and also the increase in Weight obtained by the Consumption of every 100 lbs. of Food, during each of the Successive Periods, and the Total Period of the Experiment.

Pen Nos.	Description and Quantities of Limited Food per Pig per Day.	Description of Ad Libitum or Complementary Food.	Division I. Average Weekly Consumption of Fresh Food, per 100 lbs. Live Weight of Animal.					Division II. Increase obtained by the Consumption of 100 lbs. Fresh Food.					Average Weekly Consumption of Food per 100 lbs. Live Weight of Animal.
			1st Period, 14 days.	2nd Period, 14 days.	3rd Period, 14 days.	4th Period, 14 days.	Total Period, 8 weeks.	1st Period, 14 days.	2nd Period, 14 days.	3rd Period, 14 days.	4th Period, 14 days.	Total Period, 8 weeks.	
1	None	Bean and lentil meal	37·2	36·7	30·0	26·6	32·0	21·6	20·8	18·8	18·9	20·0	32·0
2	2 lbs. Indian corn meal	Ditto	39·1	37·4	32·2	25·7	33·6	26·1	22·2	20·0	16·6	21·2	33·6
3	2 lbs. bran	Ditto	40·6	34·8	24·7	22·4	31·2	22·1	16·1	7·9	12·9	15·4	31·2
4	2 lbs. bran and 2 lbs. Indian corn meal	Ditto	38·3	31·2	31·7	29·9	32·3	19·5	16·3	15·8	18·7	17·6	32·3
		Means	38·8	35·0	29·6	26·1	32·3	22·3	19·0	15·6	16·8	18·5	32·3
5	None	Indian corn meal	33·7	23·3	26·9	19·0	25·1	18·7	15·2	23·8	23·1	20·3	25·1
6	2 lbs. bean and lentil meal	Ditto	40·0	32·1	27·0	20·8	29·5	23·2	20·6	17·0	24 5	21·3	29·5
7	2 lbs. bran	Ditto	37·9	32·9	30·1	25·2	30·7	19·4	25·5	22·6	20·7	22·1	30·7
8	2 lbs. bran and 2 lbs bean and lentil meal	Ditto	41·8	34·8	29·0	24·8	32·1	25·9	21·5	17·5	24·1	22·3	32·1
		Means	38·3	30·8	28·2	22·4	29·3	22·0	21·0	20·2	23·1	21·5	29·3
9	*2 lbs. bean and lentil meal	Bran	26·0	25·2	23 5	20·9	23·3	4·0	13·1	12·8	14·9	11·2	23·3
10	*2 lbs. Indian corn meal	Ditto	26·5	29·9	28·1	26·5	27·2	2·2	15·5	13·0	12·1	11·1	27·2
11	2 lbs. bean and lentil meal and 2lbs. Indian corn meal	Ditto	33·7	28·2	24·6	21·8	26·9	18·4	13·8	14·7	17·4	16·1	26·9
		Means	28·7	27·8	25·4	23·1	25·8	8·2	14·1	13·5	14·8	12·8	25·8
12	None	Bean & lentil meal, Indian corn meal, and bran	40·9	34·3	26·9	20·6	30·8	24·3	17·5	12·8	19·2	18·6	30·8
		Mean of 12 Pens	36·3	31·7	27·9	23·7	29·5	18·8	18·2	16·4	18·6	18·1	29·5

* Increased to 3 lbs. after the first period of the experiment.

Table XV.

(Experiments with Pigs.—Series II.)

Showing the Average Weekly Consumption of Food per 100 lbs. Live Weight of Animal—and also the Increase in Weight obtained by the Consumption of every 100 lbs. of Food, during each of the successive Periods. and the Total Period of the Experiment.

Pen Nos.	Description and Quantities of Limited Food per Pig per Day.	Description of Ad Libitum or Complementary Food.	Division I. Average Weekly Consumption of Fresh Food per 100 lbs. Live Weight of Animal.					Division II. Increase obtained by the Consumption of 100 lbs. Fresh Food.					Average Weekly Consumption of Food per 100 lbs. Live Weight of Animal.
			1st Period, 14 days.	2nd Period, 14 days.	3rd Period, 14 days.	4th Period, 14 days.	Total Period, 8 weeks.	1st Period, 14 days.	2nd Period, 14 days.	3rd Period, 14 days.	4th Period, 14 days.	Total Period, 8 weeks.	
1	None	Bean and lentil meal	31·2	22·9	23·9	22·7	24·9	19·4	17·5	14·4	21·8	18·4	24·9
2	3 lbs. barley meal	Ditto	43·0	39·6	36·4	31·8	37·0	18·3	12·8	17·8	16·3	16·3	37·0
3	1 lb. bran	Ditto	37·2	34·5	34·6	31·3	34·1	21·1	12·9	17·1	16·6	16·9	34·1
4	3 lbs. barley meal & 1 lb. bran	Ditto	42·4	33·7	32·9	24·3	33·2	18·4	16·1	18·3	11·7	16·4	33·2
		Means	38·4	32·7	31·9	27·5	32·3	19·3	14·8	16·9	16·6	17·0	32·3
5	None	Barley meal	39·3	38·1	34·1	28·7	34·6	17·5	18·5	20·7	14·0	17·7	34·6
6	3 lbs. bean and lentil meal	Ditto	40·3	35·2	29·9	17·0	30·9	26·4	13·5	16·1	16·4	18·4	30·9
7	1 lb. bran	Ditto	42·9	36·6	32·1	26·1	34·3	23·1	15·6	13·5	19·2	17·8	34·3
8	3 lbs. bean and lentil meal, and 1 lb. bran	Ditto	40·0	23·5	23·4	20·6	26·8	19·8	13·8	19·8	13·9	17·2	26·8
		Means	40·6	33·3	29·9	23·1	31·6	21·7	15·3	17·5	15·9	17·8	31·6
9	None	Mixture of 1 part bran, 2 parts barley meal, and 3 parts bean & lentil meal	41·0	37·4	34·1	22·5	33·1	15·9	18·1	18·4	15·8	17·1	33·1
10	None	Duplicate of Pen 9	40·8	38·3	33·7	28·2	35·2	23·7	17·3	14·1	18·0	18·2	35·2
		Means	40·9	37·8	33·9	25·3	34·1	19·8	17·7	16·2	16·9	17·6	34·1
11	None	Mixture of 1 part bran, 2 parts bean & lentil meal, and 3 parts barley meal	42·7	35·4	31·0	26·3	33·6	24·6	17·9	16·4	20·4	19·9	33·6
12	None	Duplicate of Pen 11	42·8	33·7	34·2	28·5	34·7	26·7	15·3	17·8	19·6	19·9	34·7
		Means	42·7	34·5	32·6	27·4	34·1	25·6	16·6	17·1	20·0	19·9	34·1
		Mean of the 12 Pens	40·3	34·1	31·7	25·7	32·7	21·2	15·8	17·0	17·0	17·8	32·7

TABLE XVI.

(EXPERIMENTS WITH PIGS.—SERIES III.)

Showing the Average Weekly Consumption of Food per 100 lbs. Live Weight of Animal—and also the Increase in Weight obtained by the Consumption of every 100 lbs. of Food, during each of the successive Periods, and during the Total Period of the Experiment.

Pen Nos.	Description & Quantities of Limited Food per Pig per Day.	Description of Ad Libitum or Complementary Food.	Division I. Average Weekly Consumption of Fresh Food per 100 lbs. Live Weight of Animal.					Division II. Increase obtained by the Consumption of 100 lbs. Fresh Food.					Average Weekly Consumption of Food per 100 lbs. Live Weight of Animal.
			1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.	1st Period, 14 Days.	2nd Period, 14 Days.	3rd Period, 14 Days.	4th Period, 14 Days.	Total Period, 8 Weeks.	
1	2 lbs. cod-fish .	Bran and Indian meal (equal parts) . . .	28·9	30·3	29·7	26·8	28·6	16·4	21·3	17·2	16·1	17·7	28·6
2	2 lbs. cod-fish .	Indian meal	29·3	27·7	26·0	23·8	26·1	18·9	24·2	23·2	22·0	22·1	26·1
3	None	Bran and Indian meal (equal parts). and cod fish	32·8	33·7	32·1	29·7	32·3	21·7	17·7	12·9	14 1	16·3	32·3
4	1 lb. cod-fish . .	Mixture of 2 parts barley-meal and 1 part bran	44·7	39·9	33·3	28·8	36·3	19·5	16·1	10·2	21·3	16·7	36·3
5	1 lb cod-fish . .	Barley-meal	56·2	40·0	33·9	27·5	39·6	23·4	18·8	17·8	11 1	18·2	39·6
		Means of the 5 Pens . .	38·2	34·3	31·0	27·3	32·6	20·0	19·6	16·3	16·9	18·2	32 6

Looking first to Table XIV. (which refers to Series I.), it is seen, by the heading, that Division I. gives the quantity, in lbs. and tenths, of the gross or fresh food *consumed weekly by every* 100 *lbs. live-weight of animal* in each pen, during each of the four successive periods, and the total period of the experiment. A glance at the figures in this division from left to right will show, that, with scarcely an exception, there is a very considerable decrease of consumption to 100 lbs. live weight, as the experiment progresses. In several cases there is scarcely half as much food consumed to a given weight of animal in the fourth period as in the first; and, indeed, in all where the progress is known to have been good, this decrease in consumption, from the first period to the fourth, amounts to about one-third or more. On the other hand, it is as clearly seen, that in those cases in which the pigs fattened but very slowly, the decrease in the consumption of food to a given weight of animal, as the experiment proceeded, is very inconsiderable.

Looking at the figures a little more in detail, we observe too, that there is a perceptibly greater decrease in consumption to a given weight of animal, where the comparatively *non*-nitrogenous Indian corn predominated, than where the more highly nitrogenous foods were more freely given.

If we now turn to Division II. of the Table—which shows the comparative *productiveness* of a given weight of food in gross increase, as the experiment progressed—we see no such obvious general gradation in this, as the animal matured, as has been observed in the rate of the *consumption* of food; though there is perhaps, upon the whole, more of a tendency to decrease than to increase in this rate of productiveness in gross increase, as the experiment proceeded. Comparing, however, the results of pens 1 to 4 inclusive, where the nitrogenous food more predominated, with those of pens 5 to 8, where the Indian meal was given in larger quantity, there is certainly, with the more highly nitrogenous diets, more of the tendency to decrease, in the proportion of gain in live weight to food consumed, than with the more *non*-nitrogenous ones.

Turning to Table XV., which gives the same particulars for the Second Series, we see, that, notwithstanding during the course of the experiment several of the pigs in this Series were unhealthy, and some died, yet the same general facts are here brought out as in Series I. Thus, taking first Division I. (Table XV.), which shows the rate of *consumption* as the animals fattened, we find (owing, doubtless, to the generally better and more uniform balance of the constituents of the food throughout this Series than in Series I.), that the decrease in the consumption of food to 100 lbs. live weight of animal, is even more general in

this series than in the former one. And, the greater tendency to decrease in consumption of food to a given weight of animal, the more within certain limits the comparatively non-nitrogenous food predominates, is here again seen.

In Division II. (Table XV.) we observe, that the rate of *productiveness* in gross increase in weight to 100 lbs. of food consumed, fluctuates so considerably from the commencement to the conclusion of the experiment, but so irregularly, that it is impossible to decide that there is any regular gradation in either direction. There is, indeed, in this case, perhaps more of the tendency to *decrease* in the rate of productiveness of the food in *gross increase* as the experiment proceeded. It is not improbable, however, that the great heat of the weather, and the unhealthiness of some of the pigs, may have had something to do with this result. Though, as we shall have further occasion to observe, a slightly lessened proportion of *gross* increase, to food consumed, does not necessarily show that the food was really less productive in *real dry* increase.

In Division I. of Table XVI., which shows the *rate of consumption*, as the experiment proceeded, with the Third or Cod Fish Series, the influence of the composition of the food on this rate of consumption by the fattening animal, is strikingly shown. Thus, in pens 1 and 2, considerably more of the highly nitrogenous cod-fish was allotted to the pigs than they would have taken, could they have obtained other food in its stead; but, in pens 4 and 5, only half as much of the cod-fish was given, so that the pigs were enabled to take a much larger proportion of the comparatively non-nitrogenous complementary foods. The result is, that with this very much larger proportion of the more *non*-nitrogenous foods in pens 4 and 5, we have in these, a very much greater decrease in the rate of consumption to a given weight of animal than in the pens 1 and 2. There was, indeed, as we shall have occasion to notice again further on, a much less proportion of food consumed to a given weight of animal, when the large amount of the highly nitrogenous cod-fish was given, than in most other cases in our experiments—and, at the same time, a full average productiveness in gross increase of that food. But, confining ourselves just now to the question of the proportion of the food consumed to the weight of the animal as it fattens, we find, looking a little more in detail to the figures in Table XVI., that small as was the decrease in consumption in either pens 1 or 2, yet it was greater in pen 2, where the non-nitrogenous Indian meal alone constituted the complementary food, than where, as in pen 1, it was mixed with a quantity of Bran. We have a similar result, more clearly brought out, in comparing pens 4 and 5; the decrease in the rate of consumption to a given weight of animal

as the experiment proceeded, being much greater in pen 5, where Barley-meal was given alone as the ad libitum food, than in pen 4, where it was mixed with Bran.

The progressive rate of *productiveness* of a given weight of food in this Third Series (see Table XVI., Division 2) is very variable, and does not show anything like regularity of gradation. The increase obtained for a given weight of food during the whole period was, however, generally good in this Series. In pen 2 it was about as high as in any case in the three Series; and we may readily suppose, that the mixture of Cod-fish and Indian-meal given in this pen 2, would supply more digestible assimilable matter in a given weight of the food, than that in any other pen in the three Series of experiments.

Upon the whole then, the experiments show very strikingly, the rapid *decrease in the rate of consumption of food to a given weight of animal as it fattens*. The fact of such a decrease is, we believe, pretty currently admitted, though we presume that the extent of it will appear from these Tables to be much greater than is generally supposed. At the same time it is seen, that although there is this great decrease in the amount of food consumed to a given weight of animal as it matures, yet that the *productiveness*—at least in *gross* increase in live weight—of a given amount of food, is much more nearly constant throughout the fattening process. It has, however, been observed, that there is perhaps a greater tendency to an increased rate of productiveness of the food in gross increase as the animal matures, the greater, within certain limits, the proportion of the more *non*-nitrogenous constituents of the food. At any rate it is undoubted, that it was under these circumstances of a larger proportion of the non-nitrogenous constituents, that the decrease in the rate of *consumption—indicating maturity*—was by far the most rapid. And, in reference to this point it may be interesting here to observe, that it appears from an extensive series of experiments which we have made with a view of determining the probable composition of the *gross* increase in weight of the fattening animal, that the nearer it approaches to maturity the greater will be the proportion of *fat* in the gross increase obtained—and also, that the greater the proportion of fat, the greater is the proportion in the gross increase of *real dry substance*. It appears, therefore, from the results, that not only is the amount of food required to a given weight of animal, the more diminished as it fattens—the more within certain limits the food contains of the *non*-nitrogenous constituents—but likewise, that it is these more *non*-nitrogenous foods that seem to give any indication of an increased rate of productiveness in *real dry increase* as the fattening process proceeds.

It will be observed, that in our remarks upon Tables XIV., XV., and XVI., we have almost confined our attention to the

question of the *progressive* rate of the consumption, and of the productiveness, of food during the fattening process—and to the influence which the character of the foods—as generally known apart from the evidence of direct chemical analysis—may be supposed to have had, on this *progression*. The actual relationship of consumption, and of increase, to the various constituents of the food, will be more clearly brought out in Tables which will shortly follow. But, before introducing this part of the subject, it will be well to subjoin statements, both of the per centage composition of the foods employed, and of the actual quantities of the various constituents consumed, with the amounts of increase which they have yielded.

In Tables XVII. and XVIII., which now follow, we have a summary statement of the per centage composition of the foods employed in the three Series of experiments.

Table XVII.

(Experiments with Pigs.—Series I.-III.)

Summary of the Percentages of *Dry Matter*, *Ash*, *Nitrogen*, and *Fatty Matter*, in the Foods employed in the 1st Series of Experiments with Pigs.

Description.	Percentage Results.							
	Dry Matter.		Ash.		Nitrogen.		Fatty Matter.	
	Inclusive of Ash.	Organic Only.	In Fresh Substance.	In Dry Matter.	In Fresh Substance.	In Dry Matter.	In Fresh Substance.	In Dry Matter.
Egyptian beans .	88·30	83·57	4·73	5·35	4·24	4·80	2·29	2·60
Lentils, Lot 1 . .	87·30	82 43	4·87	5·58	4·52	5·18	2·23	2·55
Lentils, Lot 2 . .	86·62	81·64	4·98	5·75	4·56	5·26	2·21	2·55
Indian corn meal, Lot 1 . . .	89·70	88·33	1·37	1·53	1·72	1·92	5·10	5·68
Indian corn meal, Lot 2 . . .	89·89	88·62	1·28	1·42	1·95	2·17	5·59	6·22
Bran	84·79	78·77	6·02	7·10	2·61	3·08	4·92	5·80

Table XVIII.

(Experiments with Pigs.—Series II.-III.)

Summary of the Percentage Composition of the Foods.

Egyptian beans .	88·17	84·45	3·72	4·22	4·21	4·78	2·20	2·50
Lentils, Lot 1 . .	89·42	86·44	2·98	3·33	4·54	5·08	2·25	2·52
Do. 2 . .	89·97	85·10	4·87	5·41	4·18	4·65	1·35	1·50
Barley, Lot 1 . .	82·38	80·19	2·19	2 66	1·82	2·21	2·34	2·84
Do. 2 . .	80·95	78·77	2·18	2·69	1·83	2·26	2·33	2·88
Do. 3 . .	82·53	80·48	2·05	2·48	1·55	1·88	1·41	1·71
Bran	85·08	78·67	6·41	7·53	2·62	3·08	4·98	5·85
Dried Newfoundland cod-fish	59·26	40·60	18·66	31·49	6·60	11·13	0·90	1·52

The figures in these Tables (XVII. and XVIII.), are in all cases the means of two or more determinations agreeing well with each other. The dry matter is determined by drying in a water-bath at 212°. The ash, by burning on platinum trays, in cast-iron muffles arranged specially for that process. The per-centages of ash, as given in the Table, are, however, generally too high, as, to secure a fair sample, the whole bulk of the food was well mixed together; and, from this, somewhat large samples were taken in the first instance, from which it was impossible to remove all adventitious matters, and especially so when the samples were taken from the bulk in the state of meal. The nitrogen determinations were made by combustion with soda lime, and estimated as the double platinum salt. The fatty matter is that yielded by extraction with ether.

It is seen, that the Indian-corn and Barley-meal contained less than 2 per cent. of nitrogen; the Bran about $2\frac{3}{4}$ per cent.; the Beans and Lentils about $4\frac{1}{2}$ per cent.; and the dried Cod-fish about $6\frac{1}{2}$ per cent.

Of fatty matter, on the other hand, the dried Cod-fish contains less than 1 per cent; the Beans and Lentils only about $2\frac{1}{4}$ per cent.; the Barley-meal about the same quantity; and the Indian-corn and Bran, each about 5 per cent.

These Tables of the *per-centage* composition of the foods, are employed in the construction of all the Tables which will now follow.

In Tables XIX., XX., and XXI. there are given, for the three Series respectively—the total amount of increase in live weight obtained *in each pen*; also the total amounts consumed—of each of the different foods in the fresh state as weighed out to the pigs—and of the dry organic matter—of the mineral matter—of the nitrogen—and of the fatty matter, which those amounts of fresh food contained; also a summary of the same particulars for several of the pens classed together, as well as for all the pens of each Series, respectively.

TABLE XIX.

(EXPERIMENTS WITH PIGS.—SERIES I.)

Showing the Total amounts of Gross Food or Constituents consumed, and of Increase produced, during the Total Period of the experiment.

Nos. of Pen	Total Increase of 3 Pigs during 8 Weeks.	Description of the Foods.	Total Fresh Food consumed.	Total Dry Organic Matter consumed.	Total Mineral Matter consumed.	Total Nitrogen consumed.	Total Fatty Matter consumed.
	lbs.		lbs.	lbs.	lbs.	lbs.	lbs.
1	303	Bean meal	756	632	35·74	32 06	17 36
		Lentil meal	756	620	37·34	34·34	16·73
		Total	1512	1252	73·08	66·40	34·09
2	336	Indian meal	336	297	4·41	6·26	18·16
		Bean meal	624	521	29·48	26·44	14·32
		Lentil meal	624	511	30·80	28·34	13·82
		Total	1584	1329	64·69	61·04	46·30
3	200	Bran	336	265	20·23	8·77	16·53
		Bean meal.	484	404	22·89	20·50	11·10
		Lentil meal	484	397	23·82	21·96	10·72
		Total	1304	1066	66·94	51·23	38·35
4	252	Indian meal	336	297	4·40	6·25	18·16
		Bran	336	265	20·23	8·77	16·52
		Bean meal	378	316	17·88	16·04	8·68
		Lentil meal	378	311	18·63	17·17	8·39
		Total	1428	1189	61·14	48·23	51·75
5	221	Indian meal	1086	961	14·33	20·03	58·23
6	298	Bean meal	168	140	7·93	7·12	3·85
		Lentil meal	168	138	8·27	7·61	3·71
		Indian meal	1065	942	14·06	19·62	57·05
		Total	1401	1220	30 26	34·35	64·61
7	309	Bran	336	265	20·23	8·77	16·53
		Indian meal	1063	941	13·94	19·81	57·44
		Total	1399	1206	34·17	28·58	73·97
8	347	Bran	336	265	20·23	8·77	16·53
		Bean meal	168	140	7·93	7·12	3·85
		Lentil meal	168	138	8·27	7·61	3·71
		Indian meal	884	782	11·56	16·55	47·93
		Total	1556	1325	47·99	40·05	72·02

TABLE XIX.—EXPERIMENTS WITH PIGS.—SERIES I.—*continued.*

Nos. of Pen.	Total Increase of 3 Pigs during 8 Weeks.	Description of the Foods.	Total Fresh Food consumed.	Total Dry Organic Matter consumed.	Total Mineral Matter consumed.	Total Nitrogen consumed.	Total Fatty Matter consumed.
	lbs.		lbs.	lbs.	lbs.	lbs.	lbs.
9	100	Bean meal	231	193	10·91	9·78	5·30
		Lentil meal	231	189	11·39	10·48	5·10
		Bran	431	339	25·95	11·25	21·19
		Total	893	721	48·25	31·51	31·59
10	114	Indian meal	462	409	6·03	8 66	25·10
		Bran	566	446	34·07	14·77	27·83
		Total	1028	855	40·10	23·43	52·93
11	178	Bean meal	168	140	7·93	7·12	3·85
		Lentil meal	168	138	8·27	7·61	3·71
		Indian meal	336	297	4·41	6·25	18·16
		Bran	431	339	25·90	11·25	21·19
		Total	1103	914	46·51	32·23	46·91
12	256	Bean meal.	342	286	16·18	14·51	7·85
		Lentil meal	342	282	16·78	15·52	7·60
		Indian meal	616	545	8·07	11·50	33·30
		Bran	71	56	4·27	1·85	3·49
		Total	1371	1169	45·30	43·38	52·24

Summary of Classes of Pens.

Class I. Pens 1-4.	1091	Bran	672	530	40·46	17·54	33·06
		Indian meal	672	594	8·81	12·51	36·32
		Bean meal	2242	1873	105·99	95·04	51·46
		Lentil meal	2242	1839	110·59	101·81	49·66
		Total	5828	4836	265·85	226·90	170·50
Class II. Pens 5-8.	1175	Bran	672	530	40·46	17·54	33·06
		Bean meal.	336	280	15·86	14·24	7·70
		Lentil meal	336	276	16·54	15·22	7·42
		Indian meal	4098	3626	53·89	76·01	220·65
		Total	5442	4712	126·75	123·01	268·83
Class III Pens 9 to 11.	392	Bean meal	399	333	18·84	16·90	9·15
		Lentil meal	399	327	19·66	18·09	8·81
		Indian meal	798	706	10·44	14·91	43·26
		Bran	1428	1124	85·92	37·27	70·21
		Total	3024	2490	134·86	87·17	131·43
All Pens	2914	Bean meal	3319	2772	156·87	140·69	76·16
		Lentil meal	3319	2724	163·57	150·64	73·49
		Indian meal	6184	5471	81·21	114·93	333·53
		Bran	2843	2240	171·11	74·20	139·82
		Total	15.665	13,207	572·76	480·46	623·00

TABLE XX.

(EXPERIMENTS WITH PIGS.—SERIES II.)

Showing the Total Amounts of Gross Food or Constituents consumed, and of Increase produced, during the Total period of the Experiment.

Nos. of Pen.	Total Increase of 3 Pigs during 8 Weeks.	Description of the Foods.	Total Fresh Food consumed.	Total Dry Organic Matter consumed.	Total Mineral Matter consumed.	Total Nitrogen consumed.	Total Fatty Matter consumed.
	lbs.		lbs.	lbs.	lbs.	lbs.	lbs.
1	195	Bean meal. .	528	446	19·66	22·25	11·64
		Lentil meal .	528	453	20·78	22·80	8·93
		Total .	1056	899	40·44	45·05	20·57
2	284	Bean meal .	619	523	23·07	26·11	13·65
		Lentil meal .	619	530	26·39	26·63	10·17
		Barley meal .	504	400	11·00	9·21	11·76
		Total .	1742	1453	60·46	61·95	35·58
3	242	Bean meal .	633	535	23·59	26·70	13·96
		Lentil meal .	633	542	27·03	27·22	10·36
		Bran . . .	168	132	10·76	4·40	8·36
		Total .	1434	1209	61·38	58·32	32·68
4	240	Bean meal .	397	335	14·78	16·73	8·75
		Lentil meal .	397	340	16·50	17·14	6·71
		Barley meal .	504	400	11·00	9·21	11·76
		Bran . . .	168	132	10·76	4·40	8·36
		Total .	1466	1207	53·04	47·48	35·58
5	291	Barley meal .	1643	1306	35·64	29·50	35·97
		Total .	1643	1306	35·64	29·50	35·97
6	251	Bean meal .	231	195	8·60	9·73	5·09
		Lentil meal .	231	198	9·47	10·00	3·97
		Barley meal .	907	720	19·80	16·55	21·11
		Total .	1369	1113	37·87	36·28	30·17

TABLE XX.—(EXPERIMENTS WITH PIGS.—SERIES II.)—*continued.*

Nos. of Pen.	Total Increase of 3 Pigs during 8 Weeks.	Description of the Foods.	Total Fresh Food consumed.	Total Dry Organic Matter consumed.	Total Mineral Matter consumed.	Total Nitrogen consumed.	Total Fatty Matter consumed.
	lbs.		lbs.	lbs.	lbs.	lbs.	lbs.
7	277	Barley meal .	1383	1100	29·96	24·77	30·60
		Bran . . .	168	132	10·76	4·40	8·36
		Total .	1551	1232	40·72	29·17	38·96
8	187	Bean meal .	189	160	7·04	7·96	4·16
		Lentil meal .	189	162	7·61	8·20	3·31
		Barley meal .	600	478	13·03	10·82	13·55
		Bran . . .	126	99	8·07	3·30	6·27
		Total .	1104	899	35·75	30·28	27·29
9	253	Bean meal .	369	311	13·73	15·54	8·13
		Lentil meal .	369	317	13·66	16·06	6·55
		Barley meal .	492	391	10·70	8·92	11·28
		Bran . . .	246	193	15·76	6·44	12·24
		Total .	1476	1212	53·85	46·96	38·20
10	283	Bean meal .	389	329	14·50	16·41	8·58
		Lentil meal .	389	333	16·13	16·83	6·61
		Barley meal .	519	413	11·25	9·30	11·49
		Bran . . .	260	204	16·64	6·80	12·92
		Total .	1557	1279	58·52	49·34	39·60
11	310	Bean meal .	260	219	9·68	10·95	5·73
		Lentil meal .	260	222	10·76	11·23	4·41
		Barley meal .	779	619	16·98	14·16	17·93
		Bran . . .	260	204	16·65	6·81	12·93
		Total .	1559	1264	54·07	43·15	41·00
12	307	Bean meal. .	257	217	9·56	10·82	5·66
		Lentil meal .	257	220	10·62	11·10	4·36
		Barley meal .	770	613	16·70	13·81	17·11
		Bran . . .	257	202	16·46	6·73	12·78
		Total .	1541	1252	53·34	42·46	39·91

These Tables of the actual amounts of the increase in live weight produced, and of the fresh food or its constituents consumed, furnish a complete account of the chemical statistics of the experiments, and provide a basis for any further calculations; and it is only as serving these purposes, that we have given them in detail in these Tables. We shall find, indeed, that the influence of the composition of the food, upon its consumption, and its productiveness, will be more clearly brought out in the Tables which next follow (XXII., XXIII., XXIV., XXV., XXVI., and XXVII.), in which the actual results of Tables XIX., XX., and XXI. are brought by calculation, to a more convenient and uniform standard of comparison.

We have also endeavoured to arrange some of the more important indications of these six Tables (XXII.-XXVII, inclusive), in the form of *Diagrams;* which, with the necessary explanations, will be found at the end of the Paper; and, it is thought, that a careful inspection of them, will materially facilitate a clear conception of the general bearing of the results. A glance even at the Diagrams will show, how very much greater is the variation in the proportion of the *Nitrogenous* constituents consumed in the different pens by a given weight of animal within a given time, or which is required to produce a given amount of increase, than is that of the *Non*-nitrogenous, or of the Total Organic substance.

TABLE XXII.

(EXPERIMENTS WITH PIGS.—SERIES I.)

Division I.—Showing the *Average Weekly Consumption per* 100 lbs. *Live Weight of Animal*—of Fresh Food—of Gross Dry Matter—of Mineral Matter—of Nitrogen—and of Fatty Matter. Results calculated from direct Experimental Determinations. (Quantities stated in lbs., tenths, &c.)

Pen	Pigs	Description of Limited Food.	Description of Ad Libitum Food.	Fresh Food consumed.			Gross Dry Matter consumed.			Mineral Matter consumed.			Nitrogen consumed.			Fatty Matter consumed.		
				Limited Food.	Ad Libitum Food.	Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.
1	3	None	Bean & lentil meal	–	32·0	32·0	-	28·0	28·0	-	1·54	1·54	-	1·40	1·40	-	0·72	0·72
2	3	Indian meal	Ditto	7·1	26·4	33·5	6·4	22·9	29·3	0·09	1·28	1·37	0·13	1·16	1·29	0·38	0·60	0·98
3	3	Bran	Ditto	8·0	23·2	31·2	6·8	20·3	27·1	0·48	1·12	1·60	0·21	1·01	1·22	0·40	0·52	0·92
4	3	Indian meal & bran	Ditto	15·2	17·1	32·3	13·2	15·0	28·2	0·56	0·82	1·38	0·34	0·75	1·09	0·78	0·39	1·17
5	3	None	Indian meal	–	25·1	25·1	-	22·5	22·5	-	0·33	0·33	-	0·46	0·46	-	1·34	1·34
6	3	Bean & lentil meal	Ditto	7·1	22·4	29·5	6·2	20·1	26·3	0·34	0·30	0·64	0·31	0·41	0·72	0·16	1·20	1·36
7	3	Bran	Ditto	7·4	23·3	30·7	6·2	20·9	27·1	0·44	0·31	0·75	0·19	0·43	0·62	0·36	1·16	1·52
8	3	{Bean and lentil meal and bran}	Ditto	13·9	18·2	32·1	11·9	16·4	28·3	0·75	0·24	0·99	0·48	0·34	0·82	0·50	1·04	1·54
9	3	Bean & lentil meal	Bran	12·1	11·3	23·4	10·6	9·5	20·1	0·58	0·68	1·26	0·53	0·29	0·82	0·27	0·55	0·82
10	3	Indian meal	Ditto	12·2	14·9	27·1	11·0	12·7	23·7	0·16	0·90	1·06	0·23	0·39	0·62	0·66	0·73	1·39
11	3	{Bean and lentil meal & Indian meal}	Ditto	16·4	10·5	26·9	14·5	8·9	23·4	0·88	0·63	1·51	0·51	0·27	0·78	0·63	0·54	1·17
12	3	None	{Bean and lentil meal, Indian meal and bran, each ad libitum}	-	30·8	30·8	-	27·2	27·2	-	1·02	1·02	-	0·97	0·97	-	1·17	1·17
Mean of the 12 Pens				8·3	21·2	29·5	7·2	18·7	25·9	0·36	0·76	1·12	0·24	0·66	0·90	0·34	0·83	1·17

TABLE XXII.—*continued.*

(EXPERIMENTS WITH PIGS.—SERIES I.)

Division II.—Showing the *Average Weekly Consumption per* 100 lbs. *Live Weight of Animal*—of Dry Organic Matter—of Nitrogenous Substance—of Total *Non*-Nitrogenous Substance—of Non-Nitrogenous Substance not Fat—and of Fatty Matter. Results calculated from Division I. (Quantities stated in lbs., tenths, &c.)

Pen	Pigs	Description of Limited Food.	Description of Ad Libitum Food.	Dry *Organic* Matter consumed.			Nitrogenous Substance consumed.			Total *Non*-Nitrogenous Substance consumed.			*Non*-Nitrogenous Substance not fat consumed.			Fatty Matter consumed.		
				In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.
1	3	None	Bean & lentil meal	-	26·47	26·47	-	8·84	8·84	-	17·63	17·63	-	16·91	16·91	-	0·72	0·72
2	3	Indian meal	Ditto	6·30	21·65	27·95	0·83	7·30	8·13	5·47	14·35	19·82	5·08	13·75	18·83	0·38	0·60	0·98
3	3	Bran	Ditto	6·34	19·19	25·53	1·32	6·39	7·71	5·01	12·80	17·81	4·62	12·28	16·90	0·40	0·52	0·92
4	3	Indian meal & bran	Ditto	12·70	14·17	26·87	2·14	4·73	6·87	10·56	9·44	20·00	9·78	9·05	18·83	0·78	0·39	1·17
5	3	None	Indian meal	-	22·18	22·18	-	2·91	2·91	-	19·27	19·27	-	17·92	17·92	-	1·34	1·34
6	3	Bean & lentil meal	Ditto	5·85	19·84	25·69	1·95	2·60	4·55	3·90	17·23	21·13	3·74	16·03	19·77	0·16	1·20	1·36
7	3	Bran	Ditto	5·81	20·65	26·46	1·21	2·74	3·95	4·60	17·91	22·51	4·24	16·75	20·98	0·36	1·16	1·52
8	3	Bean and lentil meal and bran	Ditto	11·20	16·15	27·35	3·05	2·15	5·20	8·15	14·00	22·15	7·65	12·96	20·61	0·50	1·04	1·54
9	3	Bean & lentil meal	Bran	10·00	8·88	18·88	3·34	1·85	5·19	6·66	7·03	13·69	6·39	6·47	12·86	0·27	0·55	0·82
10	3	Indian meal	Ditto	10·80	11·78	22·58	1·44	2·46	3·90	9·36	9·32	18·68	8·70	8·59	17·29	0·66	0·73	1·39
11	3	Bean and lentil meal & Indian meal	Ditto	13·66	8·29	21·95	3·23	1·73	4·96	10·44	6·56	17·00	9·81	6·01	15·82	0·63	0·54	1·17
12	3	None	Bean and lentil meal, Indian meal, and bran, each ad libitum	-	26·23	26·23	-	6·12	6·12	-	20·10	20·10	-	18·93	18·93	-	1·17	1·17
Mean of the 12 Pens				6·89	17·95	24·84	1·54	4·15	5·69	5·35	13·30	19·15	5·00	12·97	17·97	0·34	0·83	1·17

TABLE XXIII.

(EXPERIMENTS WITH PIGS.—SERIES II.)

Division I.—Showing the *Average Weekly Consumption per* 100 lbs. *Live Weight of Animal*—of Fresh Food—of Gross Dry Matter—of Mineral Matter—of Nitrogen—and of Fatty Matter. Results calculated from direct Experimental Determinations. (Quantities stated in lbs., tenths, &c.)

Pen	Pigs	Description of Limited Food.	Description of Ad Libitum Food.	Fresh Food consumed.			Gross Dry Matter consumed.			Mineral Matter consumed.			Nitrogen consumed.			Fatty Matter consumed.		
				Limited Food.	Ad Libitum Food.	Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.	In Limited Food.	In Ad Libitum Food.	In Total Food.
1	3	None	Bean & lentil meal	-	24·9	24·9	-	22·2	22·2	-	0·95	0·95	-	1·06	1·06	-	0·48	0·48
2	3	Barley meal	Ditto	10·7	26·3	37·0	8·7	23·4	32·1	0·22	1·05	1·27	0·20	1·12	1·32	0·25	0·51	0·76
3	3	Bran	Ditto	4·0	30·1	34·1	3·4	26·8	30·2	0·26	1·20	1·46	0·10	1·28	1·38	0·20	0·58	0·78
4	3	Barley meal & bran	Ditto	15·2	18·0	33·2	12·6	16·0	28·6	0·49	0·71	1·20	0·31	0·77	1·08	0·46	0·35	0·81
5	3	None	Barley meal	-	34·6	34·6	-	28·3	28·3	-	0·75	0·75	-	0·62	0·62	-	0·76	0·76
6	3	Bean & lentil meal	Ditto	10·4	20·5	30·9	9·3	16·7	26·0	0·41	0·45	0·86	0·45	0·37	0·82	0·20	0·48	0·68
7	3	Bran	Ditto	3·7	30·6	34·3	3·2	25·0	28·2	0·24	0·66	0·90	0·10	0·55	0·65	0·18	0·68	0·86
8	3	Bean and lentil meal and bran	Ditto	12·3	14·6	26·9	10·8	11·9	22·7	0·55	0·32	0·87	0·47	0·26	0·73	0·33	0·33	0·66
9	3	None	Mixture of 1 part bran, 2 parts barley meal, and 3 parts bean and lentil meal	-	33·1	33·1	-	28·4	28·4	-	1·21	1·21	-	1·05	1·05	-	0·86	0·86
10	3	None	Duplicate of Pen 9	-	35·2	35·2	-	30·3	30·3	-	1·32	1·32	-	1·12	1·12	-	0·90	0·90
11	3	None	Mixture of 1 part bran, 2 parts bean and lentil meal, and 3 parts barley meal.	-	33·6	33·6	-	28·4	28·4	-	1·16	1·16	-	0·93	0·93	-	0·88	0·88
12	3	None	Duplicate of Pen 11	-	34·7	34·7	-	29·4	29·4	-	1·20	1·20	-	0·95	0·95	-	0·90	0·90
Mean of the 12 Pens				4·7	28·0	32·7	4·0	23·9	27·9	0·18	0·91	1·09	0·13	0·84	0·97	0·13	0·64	0·77